APMelt™ – LEAM™
Low Emission Aluminium Melting

Air Products developed LEAM™ as an environmentally friendly solution for melting contaminated aluminium scrap in a rotary furnace. LEAM™ technology can be retrofitted to existing rotary furnaces and has now been successfully implemented into other non-ferrous metal melting processes.

The result is an extremely safe, versatile and efficient furnace that can melt a wide variety of charge materials with the minimum of scrap pre-treatment or post-treatment of emissions. All these features result in significant financial advantages to the end user.

The LEAM™ system offers the following:

- All the benefits of oxy-fuel and oxygen-enhanced combustion over equivalent air-fuel furnaces, including reduced fuel cost, increased melt rate, reduced flue gas volume and higher flame stability
- Combustion of organic fumes within the furnace, even during charging, reducing the need for pre-treatment or afterburning
- Flexibility of accepting a wide variety of contaminated or clean charge material
- Maximised yields through advanced furnace control
- Low cost method of meeting NOₓ, CO, CₓHₓ and dust emissions legislation
- Improved energy efficiency by utilising the fuel value of volatiles in the fumes
- Well-sealed charging door to minimise secondary air leakage, thereby allowing the consistent control of furnace conditions

A typical LEAM™ system consists of the following key elements:

- Highly radiative oxy-fuel burner, which also acts as an afterburner
- Flue gas analysis integrated into PLC control system
- Well sealed charging door with proprietary design

![Proprietary design charging door](image)
Well sealed and rotates with furnace to reduce ingress of air

![Offgas sensor](image)
Controls ratio between oxygen and fuel to maximise efficiency of combustion

![Highly efficient oxy/fuel burner](image)
Burner block integrated with exhaust exit to combust organic fumes
Results from a converted furnace:

<table>
<thead>
<tr>
<th></th>
<th>conventional air-fuel</th>
<th>APMel™ - LEAM™</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tap-to-tap time (%)</td>
<td>100</td>
<td>70</td>
</tr>
<tr>
<td>Energy consumption (kWh/t)*</td>
<td>850</td>
<td>420</td>
</tr>
<tr>
<td>Thermal efficiency (%)</td>
<td>35</td>
<td>71</td>
</tr>
<tr>
<td>Baghouse dust (kg/t)*</td>
<td>25</td>
<td>6</td>
</tr>
<tr>
<td>Offgas volume (%)</td>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td>NOx (kg/t)*</td>
<td>&lt;3</td>
<td>1.45</td>
</tr>
<tr>
<td>Organic compounds, C_xH_y (kg/t)*</td>
<td>0.3</td>
<td>0.03</td>
</tr>
</tbody>
</table>

*referring to total furnace charge input

Air Products offers more

Experience
- Involved in the metals industry for over 50 years
- Over 100 combustion systems installed in the non-ferrous industry
- Team of experienced process engineers, equipment engineers and technicians
- In-house development team with close links to the industry

Equipment design and supply
- Proven, proprietary designs
- Supply of combustion system, control system and instrumentation
- Door design
- Furnace modelling
- Furnace layout
- Co-ordination with furnace suppliers

Project Execution
- Start-up assistance
- Training packages including operation, maintenance and safety
- Ongoing technical assistance
- Ongoing maintenance support

Additional information
For more information on furnace technologies available from Air Products, contact the company at one of the following locations:

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